

piezoelectric material, the second set of piezoelectric elements senses the acceleration of the solid-state acceleration sensor device.

3. (Original) The solid-state acceleration sensor device of claim 2, wherein the first and second sets of piezoelectric elements are configured on a thin-film piezoelectric material.

4. (Currently Amended) The solid-state acceleration sensor device of claim 2, further comprising a third set of piezoelectric elements on the silicon chip that sense a force generated by the first set of the piezoelectric elements.

5. (Currently Amended) The solid-state acceleration sensor device of claim 4, wherein a signal sensed by at least one set of the second and third sets of piezoelectric elements is fed back to the first set of piezoelectric elements through an electronic feedback circuit.

6. (Original) The solid-state acceleration sensor device of claim 2, wherein the electrical signal applied on the first set of piezoelectric elements is variable to modify a mechanical resonant frequency of the solid-state acceleration sensor device.

7. (Original) The solid-state acceleration sensor device of claim 2, wherein the piezoelectric material of the first set of the piezoelectric elements includes conductive electrodes placed on approximately opposite sides such that application of the electrical signal to the conductive electrodes causes a longitudinal variation of the piezoelectric material.

8. (Original) The solid-state acceleration sensor device of claim 2, wherein the piezoelectric material is a thin-film piezoelectric material with a thickness of less than 10 microns and includes conductive electrodes placed on approximately opposite sides such that application of the electrical signal to the conductive electrodes causes a longitudinal variation of the thin-film piezoelectric material.

9. (Original) The solid-state acceleration sensor device of claim 2, wherein the piezoelectric material is a thin-film piezoelectric material comprising a family of Lead-Zirconate-Titanate (PZT) compounds.

10. (Currently Amended) The solid-state acceleration sensor device of claim 2, wherein the solid-state device includes a semi-rigid member fixed along a first edge to a proof mass and fixed along a second edge to ~~an outer base~~ the silicon chip.

11. (Original) The solid-state acceleration sensor device of claim 10, wherein the semi-rigid support comprises a tuning fork.

12. (Original) The solid-state acceleration sensor device of claim 10, wherein the semi-rigid support comprises a vibrating cup.

13. (Original) The solid-state acceleration sensor device of claim 10, wherein the semi-rigid support comprises a comb structure.

14. (Currently Amended) The solid-state acceleration sensor device of claim 10, wherein the semi-rigid support comprises an annular ring fixed along its outer circumference to the silicon chip and fixed along its inner circumference to a cylindrical proof mass.

15. (Currently Amended) A method of sensing an acceleration of a solid-state device formed by a plurality of thin-film piezoelectric elements on an integrated silicon chip having a first set of piezoelectric elements, a second set of piezoelectric elements, and a third set of piezoelectric elements, comprising the steps of:

actuating the first set of piezoelectric elements by a first electrical signal; and
sensing acceleration by the second and third sets of piezoelectric elements while
rejecting spurious noise.

16. (Original) The method of claim 15, further comprising the steps of generating a second electrical signal by the second set of piezoelectric elements proportional to a mechanical force along a first direction, and generating a third electrical signal by the third piezoelectric elements proportional to the mechanical force along a second direction, wherein the second direction is orthogonal to the first direction, and wherein phase of the third electrical signal shifts relative to the second electrical signal in response to acceleration of the solid-state device along said second direction.

17. (Original) The method of claim 15, further comprising the steps of connecting the second and third electrical signals to a phase-shift detection circuit, and generating an electrical output signal in proportion to a shift of the phase.

18. (Currently Amended) An acceleration sensor, comprising:

an integrated silicon chip;

a proof mass;

a first piezoelectric element for generating a force on the proof mass along a first direction by a first electrical signal;

a second piezoelectric element for generating a second electrical signal in proportion to the force on the proof mass along the first direction;

a third piezoelectric element for generating a third electrical signal in proportion to the force on the proof mass along a second direction; and

an electrical circuit connected to the first piezoelectric element for applying the first electrical signal.

19. (Original) The acceleration sensor of claim 18, further comprising a phase shift detection circuit that generates an electric output signal in proportion to a phase shift between the second and third electrical signals.

20. (Currently Amended) The acceleration sensor of claim 18, further comprising a feedback circuit for feeding back a signal sensed by at least one set of the second and third sets of the piezoelectric elements to the first piezoelectric element.

21. (Currently Amended) A method of sensing an acceleration of a solid-state device formed by a plurality of thin-film piezoelectric elements on an integrated silicon chip having a first set of piezoelectric elements and a second set of piezoelectric elements, comprising the steps of:

actuating the first set of piezoelectric elements by a first electrical signal; and

sensing vibration of the solid-state device by the second set of piezoelectric elements;

and feeding back a portion of the signal generated by the second set of piezoelectric elements to the first set of piezoelectric elements so as to actuate the first set of piezoelectric elements at a resonant frequency of the solid-state device.

22. (Original) The method of claim 21, further comprising measurement of the first electrical signal as a measure of acceleration of the solid-state device.

23. (Currently Amended) An acceleration sensor, comprising:

an integrated silicon chip;

a cylindrical proof mass suspended on the silicon chip by a semi-rigid annular ring;

a first plurality of piezoelectric elements for generating a force on the proof mass along a first direction by a first electrical signal;